

during the last four years. Further, they have not shown any results from their testing during their use of the experimental licenses to demonstrate that they cannot effectively coordinate the remaining low-powered repeaters to which they allude in the instant STA. It simply is not enough for them to say it is easier and cheaper for them, when there are known adverse consequences to others based on their economic convenience or recent understanding of simulcast interference.

They also would have the Commission overlook the fact that operating their terrestrial repeater network in a commercial setting and then having to lower the power of these repeaters will adversely impact customer services. Clearly, both XM and Sirius know the Commission will be loathe to require either licensee to alter the operation of those networks once customers subscribe to their services, and while XM asserts that the decision on the STAs will not prejudice the outcome of the rulemaking, that assertion is disingenuous. Of course, that is precisely what they hope will occur. They could just as easily argue that requiring them to alter their operations post-deployment is inconsistent with the public interest regardless of the impact on WCS customers.

Neither XM nor Sirius explain how they will disclose to their prospective customers the risk that their service may change or deteriorate during the subscription period if the rules require the STA applicants to change their networks. Will they promise refunds or price reductions? Will they compensate WCS licensees for customers lost to them by interference caused by XM or Sirius?

Nothing in the record addresses these critical issues. For the Commission to grant the STAs in light of these known risks of interference would (1) require the Commission to adopt findings unsupported by the record in these STA applications, (2) be arbitrary

and capricious, and (3) exceed its authority under Section 309 (f) of the Communications Act.

**3. The Record in the STA Applications and in the SDARS Rulemaking Establish That Grant of the STA Applications Is Not in the Public Interest**

In addition to the fact that the STA applicants have failed in their burden of proof to justify the grant of these STAs, there are other reasons why the Commission should deny these applications. Many of these reasons are the same as those that dictate against the adoption of the rules which the SDARS licensees have proposed in the SDARS rulemaking. As shown below, granting these applications, like promulgating those rules, would harm rather than serve the public interest.

**a. The Dilemma in Which the STA Applicants Find Themselves Is of Their Own Making and, Therefore, Is Not An “Extraordinary Circumstance” Justifying A Grant of the STAs**

As AT&T Wireless Services, Inc. (ATTWS), BellSouth and others noted in their initial response to XM’s STA application:

XM’s STA request is truly unprecedented. XM apparently has constructed its entire nationwide terrestrial repeater network on the basis of an *experimental authorization* and in the full knowledge that the Commission *has not adopted service rules* for these repeaters and has not had an opportunity to examine -- much less approve -- XM’s equipment designs. XM has timed disclosure of its activities to give the Commission less than eight weeks before the announced launch of commercial operations in which to consider its request for authorization. And it has done all of this in the face of substantial opposition from the WCS licensees, who have submitted numerous technical analyses in the SDARS rulemaking proceeding demonstrating that significant exclusion zones are created by high power repeaters that would interrupt service to existing subscribers and preclude service to potential subscribers. These technical analyses have gone unanswered by the SDARS licensees.<sup>36</sup>

Moreover, as mentioned above, the data submitted by the STA applicants in their applications is radically different from the most recent data submitted by XM on January 11 of this year.<sup>37</sup> And, as shown in the attached analysis prepared by BellSouth, this new data proves the validity of the WCS licensees’ concerns.<sup>38</sup>

Attachment B consists of thirteen sets of maps, one for each area covered by either or both of the STA applicants. For each market, the set of maps consist of 1) a detailed map – showing streets and the placement and WCS exclusion zones that would be created by the proposed STA terrestrial repeaters; 2) less detailed versions of the same

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<sup>36</sup> Letter from William M. Wiltshire, *et al.*, to Magalie Roman Salas, IB Docket No. 95-91 (filed July 27, 2001), at p. 2 (footnote omitted).

<sup>37</sup> *Id.*, Attachment.

<sup>38</sup> *See*, Attachment B.

maps; 3) maps showing just the interference footprints of the combined Sirius and XM terrestrial repeaters; and 4) maps of the separate Sirius or XM terrestrial repeaters.

The maps do not depict the service area of the SDARS services in general or the SDARS repeater, in particular. Rather, they show the exclusion area created by the repeater(s) in which WCS services will be overwhelmed by the operations of the specific medium and high-powered SDARS repeaters of Sirius and XM.

In the SDARS rulemaking, XM has attempted to shift the blame for the impending delay in commencing the SDARS service by raising a series of claims against the WCS licensees. As shown below, all of these claims are without merit. Moreover, they simply ignore the fact that the public interest will not be served if, in fact, the SDARS operations do impinge on WCS licensees. The Commission should not, indeed cannot, be so cavalier with the public interest.

XM has attempted to deflect attention away from this simple, uncontroverted fact by claiming that the original applications for DARS filed in 1990 proposed the so-called [but as it turned out misnamed] “gap-fillers” to “overcome blocking” in urban areas.”<sup>39</sup> This effort fails for several reasons. First, the mere fact that the applicants sought or did not seek certain things more than ten years ago is irrelevant to the public interest considerations affecting the need of other licensees (many of whom, like the WCS licensees, did not exist and were not even licensed at that time) and their customers. If these providers and customers will be adversely affected by the introduction of a new network of SDARS terrestrial repeaters, then the Commission must do what it can to ameliorate these known problems.

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<sup>39</sup> Levin Letter of August 7, 2001, at p. 2.

Second, Sirius and XM cannot absolve themselves of their failure to cooperate with the Commission and other industries in solving the interference problem earlier. Five years after XM filed that initial application, which was two years before the SDARS auction, and more than six years prior to filing of the instant STA applications, the Commission specifically noted that:

It is important for the satellite DARS systems to maintain sufficient service link margin to reproduce the original information transmitted by the satellite. Some of the satellite DARS applicants indicate that they intend to implement, as they find necessary, terrestrial repeaters, or “gap-fillers”, in urban canyons and other areas where it may be difficult to receive DARS signals transmitted by a satellite.<sup>40</sup>

The Commission went on to note, however, that “[n]one of the satellite DARS applicants, however, provided the *necessary technical information in their applications* to demonstrate how these complementary terrestrial repeater networks would be implemented. The proposed rules for satellite DARS provided in the supplemental comments include a number of provisions for complementary terrestrial networks, however.”<sup>41</sup>

The Commission further indicated: “We are not proposing rules to govern complementary terrestrial gap-fillers at this time because we do not have sufficient information.”<sup>42</sup> The Commission was also clearly concerned with the possibility, which, from the STA applications appears to have come to pass, of “whether, if a large number of gap-fillers is required, there comes a point at which the [gap-filler] service becomes essentially a terrestrial rather than a satellite service.”<sup>43</sup>

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<sup>40</sup> *SDARS NPRM* at 18, para. 55.

<sup>41</sup> *Id.* (emphasis added).

<sup>42</sup> *Id.*, at p. 18, para. 56.

<sup>43</sup> *Id.*

Two years later, the Commission noted that “[the National Association of Broadcasters (NAB)] and WFAN express concern that the use of terrestrial gap fillers would transform satellite DARS into a terrestrial based service. Indeed, in the Notice we proposed to prohibit the operation of terrestrial gap-fillers except in conjunction with an operating satellite DARS system to ensure its complementary nature and so that there would be no transformation of satellite DARS into an independent terrestrial DARS network.”<sup>44</sup> In other words, the SDARS applicants still had not provided the Commission with sufficient information to resolve the significant public interest issues raised by their “gap-filler” proposals.

Thus, those important public policy issues and more are still unresolved in that proceeding because the SDARS applicants simply failed to provide actual, technical data to the Commission until they filed their STA applications. While the SDARS applicants have known about this informational deficiency for years, one can understand their dilemma in producing information about the actual design of their gap-filler networks. Indeed, their STA applications confirm the problem.

On the one hand, the Commission is clearly and properly concerned with the public policy implications of allowing the SDARS community to convert these networks into terrestrial networks. To answer this concern the SDARS community has attempted over the years to suggest that most of the customers will obtain service from the satellites and not the terrestrial repeaters.<sup>45</sup> They continue to say that repeaters will be used in

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<sup>44</sup> *1997 SDARS Report and Order* at 5811, para. 139 (footnotes omitted).

<sup>45</sup> *E.g.*, Letter from Robert D. Briskman to Rosalee Chiara, IB Docket No. 95-91 (dated Nov. 14, 1997), at p. 4 (stating “The current plan for active terrestrial repeaters is to install them in forty major cities. A total of between 100-150 active terrestrial repeaters are believed required with higher numbers in the larger more dense cities (*e.g.*, the New

“urban canyons” and where the low elevation angle of the satellite does not provide adequate service. They are trying to say “do not worry, there will not be that many repeaters; they are just ancillary to the satellite coverage.” Yet, they did not submit analyses in their STA applications demonstrating which of these factors justifies the deployment of any of the medium or high-power terrestrial repeaters in their STA applications.

Their motivation in this regard is clear. The smaller the gap-filler network, the less it looks like a terrestrial system that others have predicted would be needed to provide adequate SDARS service. For example, commenters like CEMA warned the Commission more than six years ago that the nature of the satellite service would require large numbers of gap-fillers.<sup>46</sup> CEMA even commissioned and submitted a detailed study of the terrestrial gap-filler requirements of the satellite DARS providers by the Communications Research Centre, “Analysis of the technical merits of terrestrial gap-fillers supplementing DAR satellite broadcasting in the L-Band and S-Band frequency range” (21 May 1997).<sup>47</sup>

Likewise, NAB called for the submission of additional data about the terrestrial gap-filler network in 1997. NAB noted:

Supporting NAB’s contention [that additional technical information regarding the SDARS terrestrial repeaters was needed before the Commission could consider authorizing their use] is a comment of one of the applicants, AMRC, where it states:

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York City area might require as many as ten whereas Tampa would require at most one repeater.”)

<sup>46</sup> Comments of the Consumer Electronics Manufacturers Association, IB Docket No. 95-91 (filed June 13, 1997) (“S-Band Propagation Characteristics Necessitate that Satellite DARS Licensees Rely Upon a Substantial Network of Terrestrial Transmitters in Order to Deliver the Promised, Seamless, CD-Quality Service,”) at pp. 3-5 (CEMA Comments).

<sup>47</sup> CEMA Comments, Exhibit 1.

[American Mobile Radio Corporation (AMRC)] has not yet determined the actual number of terrestrial repeaters that it will deploy. That number depends on several factors, including the final satellite system design, *the results of frequency-specific propagation studies that have not been completed*, and studies of the significance of blocking and of interference generated by various terrestrial sources....”

The studies referred to here by AMRC belong in the record of this proceeding and should be made available to the Commission and other interested parties before any decisions regarding the use of terrestrial repeaters are reached. Clearly, information of this sort is necessary and will have a profound influence upon the rulemaking process.<sup>48</sup>

While NAB questioned many of the claims in the CEMA study, it understood the significance of the difference in the claims of CD Radio (currently known as Sirius) and CEMA. It noted:

CD Radio states that it “envision[s] using only a relatively *limited number* of repeaters located in difficult propagation environments, primarily in core urban areas.” On the other hand, CEMA indicates in its comments that, based upon the results of an independent technical evaluation which they sponsored, “the deployment of a *significant number* of terrestrial gap-fillers is necessary if S-band DARS systems are to realistically provide reasonable service to either urban or mobile users.”

These two diametrically-opposed claims cannot be resolved based upon the technical information currently available.<sup>49</sup>

By failing to produce information regarding the detailed deployment of terrestrial repeaters, the SDARS licensees effectively deflected these concerns; perhaps in the hope the Commission would simply overlook them. In any event, it is not surprising that the Commission has taken more than four years to attempt to resolve these troublesome public policy issues, issues made more difficult by the failure of the SDARS licensees to

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<sup>48</sup> Reply Comments of the National Association of Broadcasters, IB Docket No. 95-91 (filed June 27, 1997), at p. 2 (footnote omitted).

<sup>49</sup> *Id.*, at p. 3 (footnotes omitted).

provide the information that the Commission clearly indicated it needed six years ago in 1995 and again four years ago in 1997.

**b. Operation of The STA Applicants' Terrestrial Repeater Networks at Power Levels in Excess of 2 kW Is Not in the Public Interest**

Perhaps the wisdom of the SDARS licensees' "hide the ball and blame others" strategy can best be understood by the reactions caused when the SDARS licensees produced even a small bit of "technical" information about their terrestrial systems. More than two and a half years after the Commission asked for additional information regarding gap-filler networks, Sirius and XM submitted supplemental comments indicating far greater deployment than previously suggested. XM indicated it planned to deploy 1500 terrestrial repeaters with a 20-30 mile radius of the urban centers of the largest 70 urban centers.<sup>50</sup> A month later Sirius supplemented the record indicating it would operate terrestrial repeaters at about 105 sites in urban cores in about 46 cities.<sup>51</sup>

In light of this new information, the Commission expressly sought comment from the public.<sup>52</sup> According to the Public Notice, comments were due February 22, 2000. BellSouth and others filed timely and proper comments in response to this request.<sup>53</sup>

BellSouth asked the Commission to "place more stringent restrictions on terrestrial DARS operations than are being proposed by XM Radio and Sirius" in order to protect MDS, ITFS and WCS licensees and their customers from destructive interference that XM and Sirius' proposed rules would otherwise permit.<sup>54</sup> BellSouth and others have

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<sup>50</sup> Supplemental Comments of XM Radio Inc., IB Docket No. 95-91 (filed Dec. 17, 1999) at p. 3 (XM Supplement).

<sup>51</sup> Sirius Supplement, at p. 3.

<sup>52</sup> See, "Satellite Policy Branch Information," Public Notice (rel. Jan. 21, 2000).

<sup>53</sup> See, Comments of BellSouth, IB Docket No. 95-91 (filed Feb. 22, 2000).

<sup>54</sup> *Id.*, at p. 1.

followed up their comments in *ex parte* meetings and in formal filings in IB Docket No. 95-91.<sup>55</sup>

In those contacts, BellSouth and others repeatedly asked for complete deployment data on the proposed gap-filler networks. The *XM STA*, filed July 12, 2001, is the first time that XM has provided the Commission or other relevant parties with detailed information describing its proposed terrestrial network – despite the fact that they claim to have been operating these sites under their experimental licenses for nearly a year. There can be no justification for delaying until the “eleventh” hour to provide this data, especially in light of the Commission’s longstanding request for it.

The STA applicants’ protestations notwithstanding, granting the STAs under the circumstance they alone have created will be tantamount to a finding that the interests of the SDARS licensees and their customers are paramount to those of other licensees. Neither the record of the rulemaking proceeding, nor the showings of the applicants for the STAs can support such a decision.

The Commission should understand that the only area of disagreement between the WCS community and the SDARS licensees involves the appropriate power level for terrestrial DARS repeaters. Significantly, the SDARS licensees do not dispute that they could provide service solely using standard-power repeaters (those operating at no more

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<sup>55</sup> Letter from Paul Sinderbrand to Magalie Roman Salas, IB Docket No. 95-91 (filed Jan. 12, 2001); Letter from Karen B. Possner, *et al.*, to Magalie Roman Salas, IB Docket No. 95-91 (filed Jan. 25, 2001); Letter from William M. Wiltshire to Magalie Roman Salas, IB Docket No. 95-91 (filed Feb. 6, 2001); Letter from Karen B. Possner to Magalie Roman Salas, IB Docket No. 95-91 (filed March 8, 2001); Possner Letter of May 18, 2001; Letter from William M. Wiltshire to Thomas Sugrue, IB Docket No. 95-91 (filed Aug. 8, 2001). Further, BellSouth is a member of, and has coordinated closely with, the Wireless Communications Association International, Inc. (“WCA”), which has also submitted comments raising these same concerns. *See*, Sinderbrand Letter of December 15, 2000.

than 400 W/MHz).<sup>56</sup> Indeed, in meetings with Commission staff, they have conceded that they can provide the same level of service to consumers using standard-power repeaters as they can using the high-power approach they advocate. Although it has been suggested that adoption of a 400 W/MHz limitation will impose some additional costs on SDARS licensees, those additional costs are relatively small.<sup>57</sup> Moreover, they certainly were foreseeable at the time XM and Sirius entered the SDARS arena and thus should have been factored into their business plans. The Commission should reject the attempt by XM and Sirius to shift to the WCS community their costs of deploying a non-interfering terrestrial network.

Nor can the SDARS licensees seriously dispute that adoption of a 400 W/MHz limit will reduce blanketing interference to WCS. The need for the proposed 400 W/MHz limitation of terrestrial repeater EIRP has been well established in the record. Because BellSouth has not yet chosen the applications it will provide over WCS or the technology it will employ, BellSouth has not previously been able to provide a specific analysis of the impact deployment of high-power SDARS terrestrial facilities will have. Previously, however, BellSouth provided the Commission with preliminary information regarding the subscriber units it is likely to deploy<sup>58</sup> and, regardless of the applications

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<sup>56</sup> See, note 15, *supra*.

<sup>57</sup> See, Consolidated Reply of XM Radio Inc., IB Docket No. 95-91, at pp. 13-14 (filed March 8, 2000) (predicting an increase of \$45 million in costs were the Commission to impose a 400 W/MHz EIRP limitation on SDARS repeaters). Given XM's estimate, reported in various filings with the Securities and Exchange Commission, that it will spend over \$1.1 billion to deploy its service, this increase in terrestrial costs – representing less than 5% of the total cost of inaugurating service – is not material. Moreover, it should be noted that those predicted increased costs have never been quantified and neither BellSouth nor the Commission is in a position to judge whether XM's prediction overstates its case.

<sup>58</sup> See, Letter from John Tehan to Ron Repasi, IB Docket No. 95-91 (dated March 8, 2001), Attachment E, hereto.

and technology ultimately chosen by BellSouth, it does not appear today that the impact of terrestrial DARS repeaters will materially differ from that recently reported by ATTWS.

The ATTWS studies, which examine the planned SDARS terrestrial deployment in Atlanta, have shown that blanketing interference (otherwise known as “brute force overload”) would preclude WCS service to between 171,000 (if repeaters were operated at levels proposed by XM and Sirius in their “non-binding” submissions) and 435,000 households (if repeaters were operated at maximum power permitted under the XM and Sirius rule proposals). Most significantly, ATTWS concluded that “by replacing their proposed high power repeaters with multiple standard power (2 kW) repeaters, the SDARS licensees could achieve the same coverage for their own service but reduce the size of the exclusion zone in Atlanta by 141 km<sup>2</sup>, or 43.2%.”<sup>59</sup> BellSouth believes a 43.2% reduction is quite significant. This analysis has not been refuted by either SDARS licensee.

ATTWS’s analysis should put an end to the baseless notion, advocated primarily by counsel for Sirius (albeit without supporting engineering analysis), that WCS licensees actually benefit from high-power repeaters and should prefer the deployment of those facilities as compared to the use of standard repeaters.<sup>60</sup> BellSouth commissioned a separate study that confirmed the results reported by ATTWS.<sup>61</sup> The fact that not one WCS licensee agrees with Sirius or supports the deployment of high-power repeaters under the SDARS-proposed rules is telling.

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<sup>59</sup> Letter from William M. Wiltshire and Karen M. Gulick to Magalie Roman Salas, IB Docket No. 95-91, (filed April 20, 2001), at p. 2 (ATTWS Proposal).

<sup>60</sup> See, Letter from Carl R. Frank to Magalie Roman Salas, IB Docket No.95-91 (dated April 23, 2001) (Frank Letter of April 23, 2001), at p. 4.

Similarly, the time has come to dismiss Sirius' unfounded assertion that the WCS community is planning to employ "technically inferior receivers susceptible to all neighboring interference."<sup>62</sup> To the contrary, all of the equipment that BellSouth is evaluating has been carefully designed to operate in an environment in which adjacent services utilize a reasonable power level – no more than the 400 W/MHz EIRP limitation that XM acknowledges is "standard" in this band. In fact, given that BellSouth previously has provided the Commission a block diagram specifically showing the use of filtering in its subscriber units, it was disingenuous for Sirius to assert, that WCS licensees are not planning to utilize filtering.<sup>63</sup> That every WCS licensee, to BellSouth's knowledge, is willing to accept the deployment of as many terrestrial SDARS repeaters operating at power levels up to 400 W/MHz as are necessary to provide adequate coverage speaks volumes as to whether WCS equipment is being properly designed to reject reasonable levels of potentially-interfering signals.

The problem here is not that BellSouth is refusing to utilize appropriate equipment designs, but rather that it is impractical for BellSouth or any other WCS licensee to deploy subscriber equipment capable of rejecting signals from terrestrial DARS repeaters operating at 20 times the standard power level for this part of the spectrum. For example, the developer of one of the systems that BellSouth currently is examining has reported that the cavity duplexer or waveguide diplexer filters necessary to reduce the level of blanketing interference from a 40 kW DARS repeater to that level which would be caused by a standard power (400 W/MHz) repeater would cost

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<sup>61</sup> See, Attachment D (Harter Analysis II).

<sup>62</sup> Frank Letter of April 23, 2001, at p. 2 (emphasis omitted).

<sup>63</sup> Compare Tehan Letter (Attachment E), at p. 1 with Frank Letter of April 23, 2001, at p. 2.

approximately \$1,500 in quantity per transceiver (not including developmental costs) and that such filters would be so large as to be impractical for consumer applications (approximately 12 inches by 12 inches by 6 inches). Given that BellSouth contemplates using WCS as a consumer service, a requirement to use such large, expensive filters effectively destroys WCS. No amount of rhetoric from Sirius can alter the fact that the blanketing interference WCS will suffer under the SDARS-proposed rules is the result of XM and Sirius insisting on power levels more than 20 times greater than the standard for this part of the spectrum.

Although Sirius suggests that “interference from adjacent terrestrial repeaters should have – and easily could have – been avoided by the WCS licensees through compliance with existing rules,” Sirius has yet to cite to a single rule the WCS licensees have violated.<sup>64</sup> That is not surprising since BellSouth and, to BellSouth’s knowledge, every WCS licensee is in full compliance with the Commission’s rules regarding design of WCS equipment. Again, the real problem here is not that WCS licensees have failed to comply with the rules, it is that Sirius and XM have prematurely designed and constructed terrestrial repeaters operating at 20 times the power of neighboring services before adoption of final service rules permitting such power levels.

Finally, there is no merit to Sirius’ novel argument that merely because Sirius and XM advised the Commission that they hoped to deploy terrestrial repeaters operating at up to 40 kW, WCS licensees should have altered their business and technology plans to adjust to Sirius’ and XM’s desires. Of course, Sirius’ current posture cannot be squared with its prior acknowledgement that it could not finalize its terrestrial repeater system engineering until the Commission adopted final rules specifying the terms of licensing

and operation.<sup>65</sup> And, it ignores the fact that the deployment plans for terrestrial SDARS repeaters have been a constantly moving target. For example, in December 1999, XM advised the Commission that it intended to deploy only 25 repeaters with EIRPs in the 20 kW to 40 kW range.<sup>66</sup> XM then proposed rules which would allow each of the SDARS licensees to install at least 250 repeaters operating at up to 40 kW, and even more through a coordination process that unfairly benefits the SDARS licensees to the detriment of WCS.<sup>67</sup> And, while XM once represented that its high-power repeaters would be located “only in remote and isolated locations containing minimal population,”<sup>68</sup> it subsequently submitted information showing that it plans to deploy high-power boosters in the heart of major metropolitan areas (32 repeaters operating between 12 and 31.7 kW in the Boston metropolitan area alone).<sup>69</sup> Now XM seeks permission to operate nearly 800 high-power terrestrial repeaters.

**B. If the Commission Grants the STAs, It Should Condition Them to Protect the Public Interest**

BellSouth established in Section A, *supra*, that XM and Sirius have failed in their burden of proof of establishing either the extraordinary necessity or the public interest justification for the extensive number of terrestrial repeaters they request. These

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<sup>64</sup> Frank Letter of April 23, 2001, at p. 3.

<sup>65</sup> Letter from Robert D. Briskman to Rosalee Chiara, IB Docket No. 95-91, at p. 2 n.1 (dated Nov. 14, 1997) (“Detailed site engineering has not been completed: CD Radio [Sirius] is awaiting the FCC *Report and Order* so that it can comply with any regulatory requirements.”).

<sup>66</sup> *See*, XM Supplement, App. A, p. 5 (discussing proposal to operate repeaters with two carriers at EIRP levels of 10 kW to 20 kW per carrier).

<sup>67</sup> *See*, Letter from Bruce D. Jacobs to Magalie Roman Salas, IB Docket No. 95-91 (dated April 25, 2001), at Exhibit 1.

<sup>68</sup> XM Supplement, App. A, p. 5.

<sup>69</sup> An engineering analysis of those repeaters was provided to the Commission by WCA, which established that deployment would have a substantial adverse impact on WCS in the Boston area. *See*, Attachment C (Harter Analysis I).

showings must be provided before the Commission is empowered to issue STAs under Section 309 (f) of the Communications Act or Section 25.120 of the Commission's Rules. Accordingly, the Commission should dismiss both applications.

If the Commission nevertheless decides to grant the STAs, it must protect the public from potential harms from the operation of these systems. As noted above, the purpose of the SDARS rulemaking proceeding, like those of all rulemakings in which the Commission seeks to develop rules against interference between and among adjacent radio licensees, is to reduce potential interference before it happens.

It is very difficult for a given licensee to identify the source of interference. Indeed, that is why the STA applicants' claims regarding the absence of interference during their operations under their experimental licenses ring so hollow. In these STA applications, it is not the responsibility of the WCS licensees to show that the SDARS terrestrial repeater systems are interfering or will interfere with their WCS licenses. It is the STA applicants' duty to establish that, in light of known risks, that either their service inherently will not interfere with others, or that they have taken adequate steps to prevent (not just cease) potential interference with other licensees.

In the absence of necessary information from the STA applicants or a meaningful plan to avoid the risks that have been presented to the Commission in the SDARS rulemaking, the Commission must, if it chooses to proceed with these STA applications, address these known risks. Indeed, both applicants implicitly recognize the need for conditions, albeit grudgingly, although the conditions they propose are wholly inadequate (and entirely self-serving) to the task.

For example, the STA applicants “certify” that they will operate the terrestrial repeaters under the STA so that the out-of-band emissions will be attenuated below the transmitted EIRP by no less than  $75 + 10 \log (p)$ .<sup>70</sup> While helpful, the certification is inadequate standing alone. It should be made an enforceable condition to the grant of the STA.

Moreover, as shown above, the SDARS rulemaking leaves many critical technical issues open after more than six years of analyses. In order to ensure that the STA applicants operate in a manner consistent with the public interest, the Commission should impose clear conditions on those operations so that the STA applicants and the licensees in adjacent spectrum will understand what the Commission expects from them.

Set forth below is a set of conditions designed to address the issues discussed throughout Section A, above, that have been raised in (and remain unresolved by) the SDARS rulemaking or by the STA applications. The Commission should condition the grant of both of the STA applications on the following conditions:

- 1) The STA holder must immediately cease operation of any and all repeaters (including the “low-power” repeaters not listed in the STA requests) upon receipt of notification by the license holder of any other service of any interference from the STA holder’s repeater(s);
- 2) The STA is granted without prejudice to the Commission’s actions in the pending terrestrial repeater rulemaking;
- 3) The STA terminates no later than 180 days from the grant and no extensions or waivers will be granted;
- 4) The STA holder must certify that the unspecified number of the so-called low-power repeaters (*i.e.*, EIRP of 2 kW or less) will comport with two basic requirements:

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<sup>70</sup> *Sirius STA*, at p. 3; *XM STA*, at p. 2. These certifications reflect issues raised by BellSouth in its Comments in IB Docket No. 95-91 (Comments of BellSouth, IB Docket No. 95-91, (filed Feb. 22, 2000), at pp. 9-10).

- a. The spectral mask must limit out-of-band emissions by SDARS terrestrial repeaters to no more than  $75 + 10 \log (p)$  dB less than the transmitter EIRP ( $p$  being the EIRP in watts), and
  - b. The EIRP of every SDARS repeater must be limited to no more than 400 W/MHz;
- 5) The STA holder must:
  - a. Immediately upon grant publish the location of every terrestrial repeater to be operated pursuant to the STA by longitude and latitude, identify the power level and antenna height for each location and repeater, identify the operating characteristics of each repeater by location (*e.g.*, direction of signal),
  - b. Report to the Commission on the first day of every month during the operations pursuant to the STA, of any changes in the operations of the listed repeaters, and
  - c. Not commence operation of any terrestrial transmitter not listed in the initial report required by Condition 5 (a), above;
- 6) The STA holder must cooperate with licensees of other radio services that may be affected by the operations under the STA, by responding completely and timely to requests for:
  - a. Further technical information concerning the operations of the repeaters listed in the report required by Condition 5, above;
  - b. Joint testing of the terrestrial repeaters with the current and future services used by the WCS licensees and the customer equipment used therewith;
  - c. All technical studies, analyses, internal memoranda, correspondence, or manufacturer specifications and analyses (including e-mail) prepared by or for or used by the STA applicants in the designing of their terrestrial repeater networks including but not limited to:
    - any which demonstrate the operational characteristics of the satellite signals to be employed in the SDARS licensees' systems and the reliability and impact of those characteristics on reception quality of those signals by customer receivers, including but not limited to the reliability of coverage areas of those satellites without the use of the terrestrial repeaters or low power repeaters; and,
    - any and all comparisons in the possession of the STA applicants concerning the relative benefits/costs among the various possible options for operating the terrestrial repeaters, including but not limited to any studies showing the costs/operational benefits or difficulties in operating low power rather than so-called moderate or high-power repeaters; and

- 7) The STA applicants must submit to the Commission and the Commission must seek public comment on detailed and specific plans of the STA applicants regarding:
- a. Their advertising materials designed to notify prospective customers that the STAs will expire and that they may, therefore, have to alter the operation of the terrestrial repeater network which may materially degrade the quality or reach of service;
  - b. Their business plans for changing the compensation due from customers if the service quality or reach must be degraded; and,
  - c. Their plans for compensating any licensee or its customers for any interference that may be caused by the operation of the terrestrial repeaters under the STA authorization.

BellSouth believes that the Commission should not grant the STAs until the applicants have complied with these conditions, especially Condition 7. The STA applicants themselves plead that it is important that they offer a high quality service and that the terrestrial repeaters are absolutely key to delivering that service. Accordingly, they cannot contend that terminating the STAs or ceasing operations of high-power repeaters that cause interference will not materially affect their customers. If they really believe their own rhetoric, they must accept Condition 7.

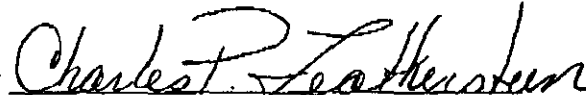
## CONCLUSION

For the reasons set forth above, BellSouth requests the Commission to deny the STA applications of XM and Sirius to operate extensive terrestrial repeater networks in association with their SDARS systems. If the Commission nonetheless grants those STAs, it should impose the conditions set forth in Section B, above, on those grants.

Respectfully submitted,

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## **ATTACHMENT A**

**Calculation of Blanketing Interference (Exclusion Zones)  
of BellSouth WCS Services by Operation of  
SDARS Terrestrial Repeaters at Power Levels in Excess of 2 kW.**

## ATTACHMENT A

This attachment explains the problem of “blanketing” interference in more detail and calculates its impact on the equipment BellSouth plans to deploy in the WCS band.

### Types of Interference:

During normal operation, radio receiver can be exposed to various forms of RF interference. Three forms that affect the performance of radio receivers in mobile and fixed services have been called out-of-band intermodulation interference, threshold degradation interference, and blanketing interference (also called brute force overload and blocking). Of these three forms of RF interference, the last two will be addressed.

### Measuring the Impact of Interference on System Operation:

One practical way to describe the level of interference generated by a transmitter is to establish a geographic “exclusion” zone. This exclusion zone is that area around the interfering transmit site where the interference generated would cause enough degradation to the victim receiver that it cannot be operated successfully in a particular area. For example, if an interfering transmitter begins to cause some level of measurable degradation when it is 10 miles or less from the receiver, then the exclusion zone can be described by a circle of 10 miles radius.

Thus, if an interfering transmitter is placed at the center of a city and creates a 10 mile exclusion zone, then the victim receiver is excluded from operation within 10 miles of the city center. Inside that circle, receivers are *excluded* from operation because of the interference generated by the transmitter. Each type of interference generates its own unique exclusion zones, which may vary in radius from a few hundred feet to more than 20 miles, depending on the specifics of the transmitter, the receiver, and the geography

involved. Clearly, small exclusion zones –hopefully having a radius of a few hundred feet are desirable, since they permit both the interfering transmitter and the victim receiver to operate in the same geography where the population base is located.

Note also that exclusion zones are cumulative. If two exclusion zones are adjacent, then a receiver is excluded from both. If they overlap, their effect is additive, and the larger exclusion zone will be expanded to some extent, based on the specifics of the situation. Thus multiple transmitters in a city will create an exclusion zone that is even larger than the “footprint” of each one individually.

#### Threshold Degradation Calculations for WCS:

Threshold degradation interference occurs when an out-of-band transmitter produces spurious emissions in the pass band of the exposed receiver. These interfering emissions appear as noise in digital receivers and raise the noise floor of the exposed receiver. Raising the noise floor of the exposed receiver impacts its operation and, if large enough, significantly increases the receiver bit error rate. The impact of the SDARS terrestrial repeaters on the operation of WCS systems can be determined by calculating the WCS exclusion zone of operation created by an SDARS repeater.

Assuming a 40 Kilowatt SDARS repeater, and the technical characteristics of the equipment BellSouth plans to deploy, the proposed SDARS out of band emission limit of  $70 + 10\log(P_T)$ , and line of sight, the radius of the exclusion zone is calculated in the table below.

SDARS EIRP	76 dBm
SDARS Power in WCS Band	-70 dBm
BellSouth WCS Receiver Threshold	-101.8 dBm
Interference Level to Cause 1 dB Increase in Threshold	-107.8 dBm
BellSouth Receiver Antenna Gain	24 dBi
SDARS Power at Input to BellSouth WCS Receiver	-46 dBm
Path Loss Required	61.8 dB
Interference Exclusion Distance at 2300 MHz	42 Feet

As can be seen from the above calculation, the impact of SDARS threshold degradation interference is not significantly limiting, and this can be attributed to the proposed SDARS out of band emission limit. BellSouth believes that the exclusion zone for threshold degradation is small enough that its equipment and proposed deployment will not be impacted.

#### Blanketing Interference Calculations for WCS:

The third form of RF interference, blanketing interference, occurs when a large signal out of the pass band of the affected receiver appears at the receiver's first amplifier stage, or "front end". This large signal competes with the desired received signal for receiver resources. The competition for receiver resources affects the desired received signal by reducing its power level at the amplifier's output. If the interfering signal is strong enough, it can block the receiver from passing the desired signal.

In correspondence with the FCC and discussions with the SDARS licensees, BellSouth has stated that the maximum level of blanketing interference that BellSouth's WCS receiver will be able to tolerate is expected to be - 35 dBm at the input to this first amplifier stage.

In addition BellSouth has stated that the maximum filtering (suppression of the undesired signal by the filter) that can be expected by reasonably priced WCS CPE receivers from interfering signals in the SDARS terrestrial band is 3 to 4 dB. Under these conditions, the impact of blanketing interference from the SDARS terrestrial repeaters on the operation of WCS systems can be determined by calculating the WCS exclusion zone of operation created by an SDARS repeater. Assuming a -35 dBm WCS blocking receiver level, 4 dB WCS receiver filtering at the SDARS repeater frequency, a 24 dB “victim” receiver antenna and line of sight transmission, the radius of the WCS exclusion zone for various SDARS repeater power levels can be calculated and is shown in the table below.

#### INTERFERENCE EXCLUSION ZONES WITH 24 dB Antenna Gain at CPE

SDARS Repeater Power (KW)	40	20	10	5	2
SDARS Repeater Power (dBm)	76	73	70	67	63
BellSouth WCS Filtering (dB)	4	4	4	4	4
BellSouth Receiver Blocking Threshold (dBm)	-35	-35	-35	-35	-35
BellSouth Receiver Antenna Gain (dBi)	24	24	24	24	24
SDARS Power at Input to BellSouth Receiver (dBm)	96	93	90	87	83
Path Loss Required (dB)	131	128	125	122	118
Interference Exclusion Distance at 2300 MHz (Mi)	23	16	11.5	8	5

Thus, if a single 40 KW SDARS repeater is placed in the center of Charlotte, NC, BellSouth will be excluded from operating its WCS service anywhere within 23 miles of the center of Charlotte. Given the distribution of population within the Charlotte area, BellSouth is prevented from offering this service to essentially all of its customer base in the Charlotte area. Should both Sirius and XM install repeaters in downtown Charlotte,